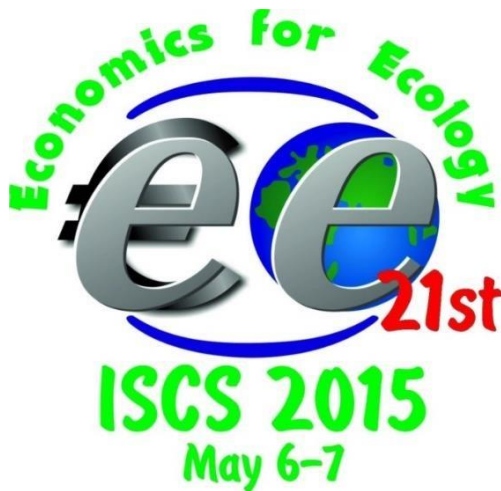


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# **CONSTRUCTIVE-GEOGRAPHICAL ASPECTS OF ANTHROPOGENIC ENVIRONMENTAL IMPACT ASSESSMENT IN UKRAINIAN REGIONS IN 2000-2012**

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The current environmental protection system in Ukraine is based on assessment of different kinds of impacts of human activities without considering anthropogenic factors. This refers to use of normative environmental impact assessment method and ecological expertise. To evaluate the complex impact of population on the territory, the methodology of ecological or environmental footprint can be used [1]. This methodology can help to implement principles of constructive geography in territorial management. Additionally, it is worth mentioning that the ecological footprint methodology can be used to improve a regional environmental management.

This study uses approaches of constructive geography and environmental economics. The former includes considering spatial aspects and complex environmental impact of population and mapping the results. The latter reveals to implementation of natural capital and natural rent concepts in geographical study. It is important to outline that in such a context the territory is considered as a natural asset, so it might be treated using economical approaches as well as geographical. Method of ecological footprint demonstrates the finiteness of natural capital, pointing to the size of the territory which is equivalent to the amount of resources and ecosystem services consumption.

The methodology was modified in order to calculate the indicator at the regional level to find out the differences in spatial distribution of anthropogenic environmental impact in Ukrainian regions [2].

The study took into consideration the following ecosystem services:

- Provisioning services - food production;
- Regulative services - the ability of forest areas to capture and store CO<sub>2</sub> and thereby regulate the climate; in the context of agriculture is also important to note the role of pollinators that provide regulatory services;
- Support services - providing space for infrastructure necessary to maintain the lifestyle of population.

An important aspect is that the territory is a natural capital according to environmental economics approach. Therefore, it is reasonable to determine countries, which are the donors of the natural capital, and countries, which are recipients of such a natural rent. Ditto applies to regions within a single state. Additionally, the land of a nature reserve fund is regarded as a producer of natural capital and ecosystem services, so although it is limited to utilization, these territories can compensate environmental impact through the provided ecosystem services and a high quality of the natural environment [3]. Thus, cultural ecoservices are partially considered within the study.

The ecological footprint was calculated for a typical citizen of Ukraine and each Ukrainian region in 2000, 2005, 2010, and 2012. The study has shown that Ukraine exports ecosystem services of its territory, which are materialized in production of plants growth and the quality of the environment.

The research confirmed that Ukraine as a whole, as well as most of its regions were recipients of ecosystem services in 2000-2012, so the population demonstrated unsustainable consumption. The calculation of footprint values at regional level showed the range from 101 to 105% of the bioproductive territory. In general, the largest ecological deficit, and therefore the least sustainable use of natural resources and ecosystem services of the territory is observed in Donetsk, Luhansk, Dnipropetrovsk, and Kyiv regions. Between 2000 and 2012, only one region – Kherson region in 2000, Kirovohrad region in 2005 and 2010, and Odessa region in 2012 – showed a positive environmental balance.

The temporal and spatial distributions of the environmental impact on the territory of Ukrainian regions were examined and analyzed. The anthropogenic impact on the environment over the studied period increased in the Eastern regions and slightly decreased in the Western and Northern regions. However, a decline of livestock's footprint and growth of fishery products' footprint was observed in some areas, compared to the year 2000. The regions were split into five groups based on the extent and dynamics of human impact on the environment during 2000-2012, including two groups with the highest anthropogenic environmental impact; two groups with median impact, and one group with minimum impact. Environmental impact in two groups demonstrated a growing tendency.

Considering the structure of ecological footprint, two groups of influencing factors were determined: the demand value for goods and

services and efficiency of resource utilization. Their effects were confirmed by correlation and regression analysis on the regional level. It was established that growth of income in some Western regions would cause lower increase in environmental impact, compared to other regions [4].

Thus, the consumption of population in the regions was unsustainable in 2000-2012, which means the ecosystems were not able to secure the demand for natural resources and ecosystem services. The greatest burden fell on forest ecosystems and areas of livestock development.

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